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Ian Grey Groundwater Consulting

Groundwater Monitoring at Landfills: is your data telling you the whole story?

- Groundwater review of 10 Sydney landfills
  - Groundwater setting
  - Monitoring networks
  - Monitoring programs
  - Monitoring data
- Focus: assessing adequacy of monitoring

Why Monitor Groundwater?

- Understand setting and risks
- Detect impacts
- Operational control
- Because you have to

Groundwater Monitoring – Typical

- Chemical focussed
- Limited emphasis on understanding groundwater processes or risks

Why do anything else?

- Focus resources where needed
- Understand risks and liabilities
- Reduce ongoing requirements
- Value for money

Designing an Effective Monitoring Network

- Understand the setting
- Understand the risk

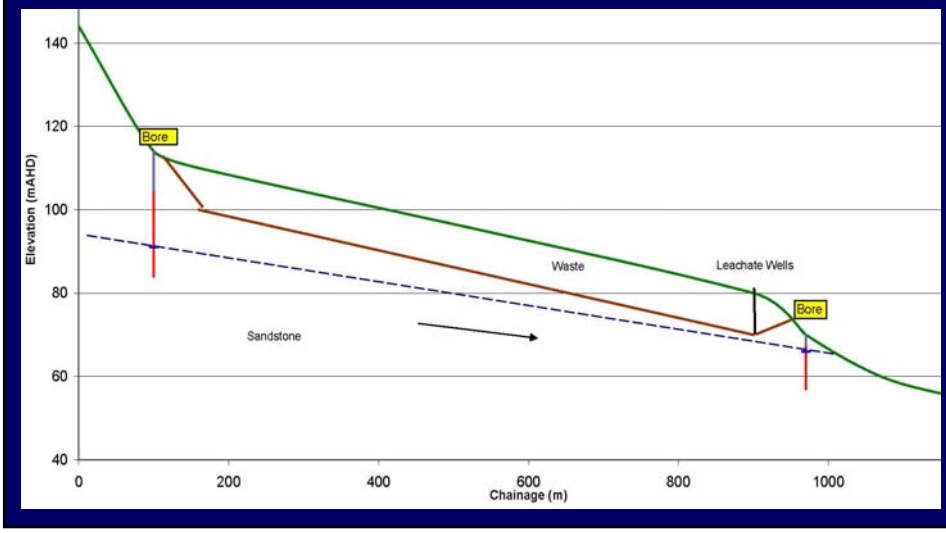
- Source – leachate chemistry, volume, head
- Pathway – liner, unsaturated strata, groundwater system(s)
- Receptor

Designing a Network

- Number of bores
- Location
- Depth
- Design

- Requirements may change with understanding!

Example - shallow, single aquifer



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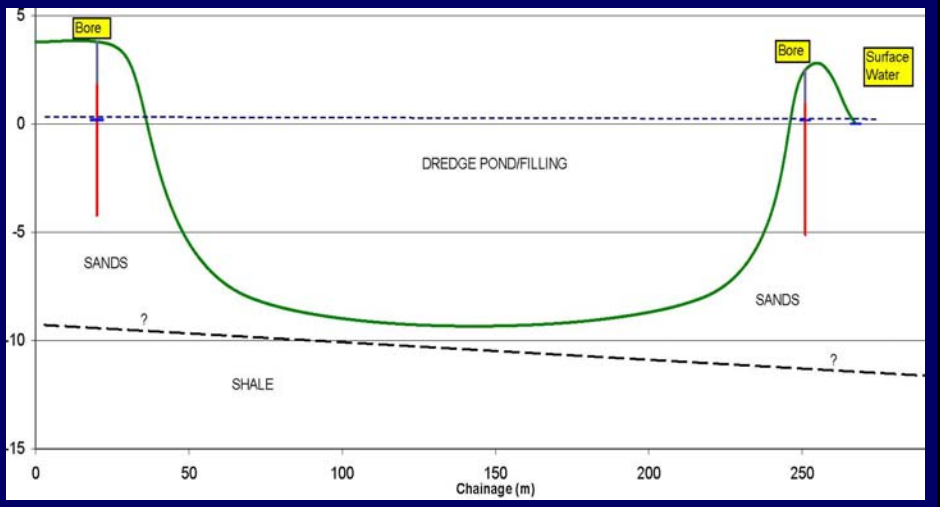
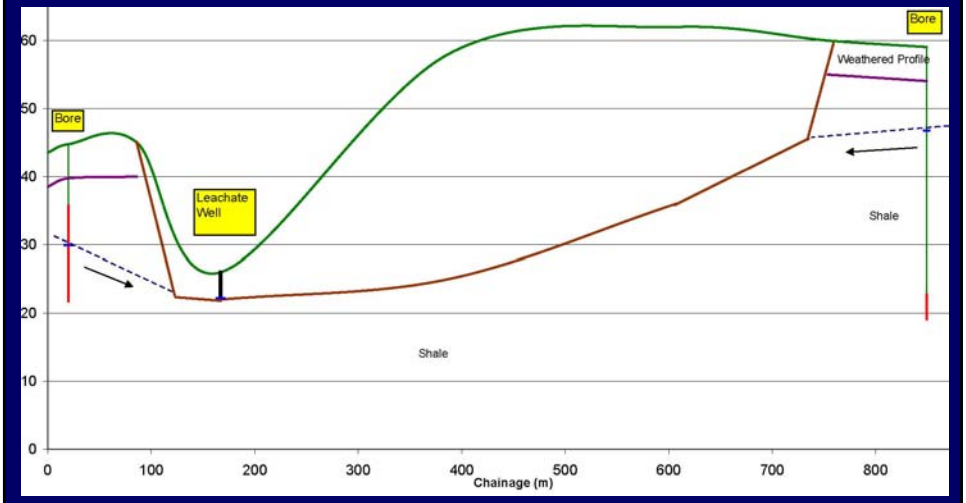
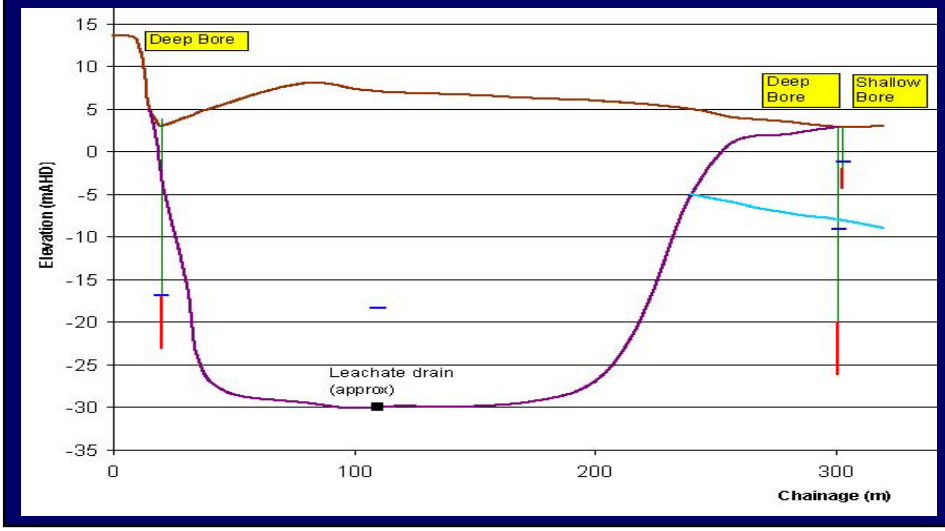


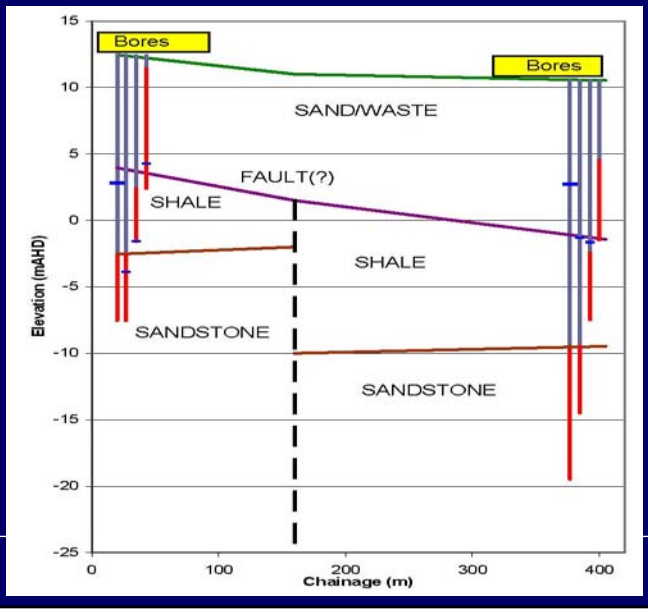
Example - Deep, single aquifer



Example - Multiple Aquifers



Example – Complex Setting



Bore Design

- Single or multiple aquifer
- Length of screened section
- Bentonite seals
- Maintenance

Leachate Monitoring

- Levels
- Chemistry

Monitoring Program

- Frequency
- Analytical suite
- Sampling methods
- QA/QC

Assessment and Reporting

- Quarterly assessment
- Annual review
  - Groundwater levels, flow direction
  - Potential for migration
  - Major ions
  - Key indicators
  - Other analytes

Common Shortfalls

- Poor understanding
  - Groundwater levels/flow
  - Leachate levels
  - Migration processes
- Monitoring locations
- Bore design and construction
- Data review and assessment
- Record keeping

What Makes a Good Program?

- Provides clear understanding of site conditions
- Identifies risks and impacts
- Assists site operation

Groundwater Monitoring – Why Should it Matter to You?

- Manage risk and liability
- Respond to changing conditions
- Minimise long term costs – closure

- Sites Change
- Environmental requirements and legislation change!

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